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“FINANCE AND GROWTH” RE-VISITED

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We test whether the relationship between finance and growth is present in 48 countries over 20 different periods of an equal length of 15 years, starting in 1980 (to 1995) and ending in 1999 (to 2014). We estimate growth regressions using an IV approach and we find that (1) overall financial development had a positive effect on economic growth for *almost all* our studied periods, (2) the *legal system* is the primary determinant of the effectiveness of the overall financial system, and (3) financial services were relevant for economic growth even during the financial crisis of 2008. This research is part of a research agenda revisiting the finance–growth nexus using up-to-date empirical methodologies.

Keywords: Financial structure; economic growth; financial development.

JEL Classification: O16, G16, G20

1. Introduction

We empirically re-visit the finance–growth nexus. The reason for this re-visitation is the primacy of the economic growth question for economics. Religion,^a inequality,^b

^aReligion may explain differences in economic growth across regions (Landes 1999) and across European cities between 1500 and 1750 (Dudley & Blum 2001) and may determine economic development (McCleary & Barro 2006), investor protection (Stulz & Williamson 2003), economic attitude (Guiso *et al.* 2003), risk aversion (Hilary & Hui 2010), and entrepreneurship (Audretsch *et al.* 2007, Braggion *et al.* 2009).

^bIn order to maintain their hold on power, wealthy elites may prevent the sound development of institutions conducive to economic growth such as schools, courts, and banks, thus impairing economic development (Engerman & Sokoloff 1997, Glaeser *et al.* 2003, Sonin 2003, Berkowitz & Clay 2011, Rajan & Ramcharan 2011, Acemoglu & Robinson 2013, pp. 152–158).

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laws and institutions, including schools, courts and “banks”, are among the often investigated drivers of local entrepreneurship,^c and economic growth. So, an assessment of how finance affects growth remains topical.

To accomplish our re-visitation, we analyze the finance–growth nexus for 48 countries in various time windows over the period of 1980–2014. Using Two-Stage Least-Square (TSLS), we test the impact of overall financial services provided by financial institutions (banks, stock market, and other financial institutions) on economic growth (*financial services view*). Second, we employ an Instrumental Variable (IV) approach to test whether the legal system exerts a positive effect in the finance and growth relationship (*legal and finance view*). We consider 20 periods of 15 years (starting in 1980–1995 and ending in 1999–2014) to evaluate if the finance–growth nexus of the early periods persists in the last periods of our rolling window sample.

In the theory of finance–growth, there are two opposite points of view. [Bagehot \(1873\)](#) and [Hicks \(1969\)](#) for example posit that finance–growth nexus promoted the mobilization of capital at the beginning of the England industrialization, while [Schumpeter \(1911\)](#) argues that financial intermediation provided by banks promotes innovation and economic development. However, other authors disagree with them. [Lucas \(1988\)](#) for example rejects the idea that finance matters for economic growth, while [Robinson \(1952\)](#) claims that finance only follows economic development.

But, in 1969, Goldsmith is the first to empirically document positive correlations between financial development and GDP per capita. He uses the assets of financial intermediaries relative to GNP and the sum of the net issues of bonds and securities plus changes in loans relative to GNP as financial development data. However, he had no means to control for other factors associated with economic growth that could be driven by other country characteristics correlated with both finance and growth and/or provide any inference on the direction of causality between finance and growth ([Beck 2009](#)).

In the early 1990s, more data and country characteristics became available. In their seminal paper, [King & Levine \(1993\)](#) add financial sector measures to the standard cross-sectional framework explaining economic growth. They run a cross-section of 80 countries for the period of 1960–1989 and they conclude that finance matters for growth. They also find that financial development helps to predict the rate of economic growth of countries for the following 10–30 years. Their results are consistent with Schumpeter’s view: “services provided by financial intermediaries stimulate long run growth” (*op. cit.*, p. 1).

The early finance and growth literature uses standard cross-country OLS regressions (references), but they are only consistent if the orthogonality condition

^cStarting with Schumpeter and until more recently, entrepreneurship is considered an important component of economic growth ([Schumpeter 1934](#), [Aghion & Howitt 1992](#), [Akcigit & Kerr 2018](#)), and it is therefore no surprise that the study of its determinants has gained attention in the academic literature (e.g. [Dunne et al. 1988](#), [Glaeser & Kerr 2009](#), [Kerr & Nanda 2010](#)).

prevails. Beck (2009) explains that the classical approach to overcome the biases related to OLS is to identify and instrument as to isolate that part of the variation in the endogenous variable that is not associated with reverse causation, omitted variables, and measurement error (*op. cit.*, p. 6).

In 2001, Beck *et al.* (2001) run IV regressions to test the financial services and the law and finance's view. Based on the work by La Porta *et al.* (1998), they take instruments of the legal origin of countries (English Common Law, French, German and Scandinavian Civil Law), the protection of corporate shareholders (*anti-director*) and creditors (*creditor*), and the quality of their enforcement (*rule of law*). They also consider the work of Rajan & Zingales (1998) to test whether industries that depend more heavily on external finance grow faster. And once more they find strong evidence of both the financial services and law and finance views.^d

While the evidence on the link between finance and growth has further expanded during the last few decades (Table 1), the Global Financial Crisis has re-opened the debate on whether beyond some level of financial depth, there is "too much finance", i.e. there are no more positive benefits to further growth in finance due to increasing financial fragility and macroeconomic instability (Loayza *et al.* 2018). They also call for an "integrated approach" that recognized the existence of a trade-off associated with the dual effect of policies fostering financial development, potentially leading to both higher growth and higher crisis risk.

Beck (2018) for example highlights that in the past 20 years, the empirical evidence on one hand supports the idea that financial sector deepening is a critical part of any successful economic development process, but on the other hand the banking crisis literature has identified rapid credit growth as a good predictor of systemic banking distress. Consequently, Arcand *et al.* (2015) examine whether there is a threshold above which financial depth no longer has a positive effect on economic growth. They show that financial depth starts having a negative effect on output growth when credit to the private sector reaches 100% of GDP. Their results are consistent with the "vanishing effect" of financial depth found by Rousseau & Wachtel (2011).

Since a systemic risk perspective, the World Bank (2013) points that financial system supports risk management by offering various financial tools^e to people and their support systems (Households, the community, enterprises, the state, and even the international community), but the systemic risk could arise from the procyclical^f

^d "Economies grow faster, industries depending heavily on external finance expand at faster rates, new firms form more easily, firm's access to external financing is easier, and firms grow more rapidly in economies with higher levels of overall financial-sector development and in countries with legal systems that more effectively protect the rights of outside investors" (Beck *et al.* 2001, p. 233).

^e "For example, payment and foreign exchange services, saving instruments (bank deposits and liquid securities), credit, market insurance, debt and equity investments, risk-taking capital, public trading of assets, and risk pricing information" (World Bank 2013, p. 194).

^f "Not only do the financial and real cycles move together but banking crises can spill over to macroeconomic crises or be triggered by a spillover from macroeconomic crises" (*op. cit.*, p. 204).

Table 1. Evidence of financial structure and economic growth.

Paper	Countries-industries	Period	Level of analysis				Source	Results
			Country	Industry	Firm	OLS IV		
Goldsmith (1969)	35	1860–1963	Yes		Yes	Authors' data		Positive correlation between financial structure and economic growth.
King & Levine (1993)	80	1960–1989	Yes		Yes	Authors' data		Financial development is strongly associated with economic growth, financial development precedes growth, and its positive associated with both investment rate and the efficiency with which economies use capital.
La Porta <i>et al.</i> (1998)	49	1998	Yes		Yes	Authors' data		Countries with legal origin in common law tend to protect investors more than the countries based on civil law.
Rajan & Zingales (1998)	42–36	1980–1990	Yes	Yes	Yes	Standard and Poor's Computat (1994)		Industrial sectors that are relatively more in need of external finance develop faster in countries with more developed financial markets.
Beck <i>et al.</i> (2001) a.	48	1980–1995	Yes		Yes	World Bank; OECD; GFDD; Barro & Lee (1996)		Higher level of financial development and legal systems that protect the rights of outside investors have a positive effect over economic growth.
Beck <i>et al.</i> (2001) b.	34–36	1980–1989		Yes	Yes	World Bank; OECD; GFDD; Barro & Lee (1996); ISY-UN		Industries that depend relatively more on external finance grow faster in economies with higher levels of financial development and legal systems that better protect the rights of outside investors.

Table 1. (Continued)

Paper	Countries- industries	Level of analysis				Model		Source	Results
		Period	Country	Industry	Firm	OLS	IV		
Beck <i>et al.</i> (2001) c.	33	1990–1995			Yes	Yes	Accounting data for the largest publicly traded manufacturing firms	New firms form more easily, firms' access to external financing is easier and firms grow more rapidly in economies with a higher level of financial sector development.	
Beck <i>et al.</i> (2012)	45	1994–2005	Yes		Yes	Yes	World Bank WDI, Beck <i>et al.</i> (2007, 2010), <i>La Porta et al.</i> (1999)	There is a positive and significant relationship between enterprise credit and GDP per capita growth, but also that household credit enters insignificantly across different specifications.	
Rousseau & Wachtel (2011)	84	1960–2004					World Bank WDI 2007 edition.	The finance–growth relationship that was estimated with data from 1960 to 1989 disappeared over the subsequent 15 years.	
Beck <i>et al.</i> (2014)	77	1980–2007	Yes		Yes		World Bank WDI, United Nations. Barro & Lee (1996), and KLEMS.	Financial intermediation is positively associated with growth and negatively with growth volatility; however, both effects have become weaker over time.	
Arcand <i>et al.</i> (2015)	45	1960–2010	Yes		Yes	Yes	World Bank WDI (2011), Barro & Lee (2010), Beck <i>et al.</i> (2000, 2010, 2012), and authors' data	Financial depth starts having a negative effect on output growth when credit to the private sector reaches 100% of GDP.	
Rousseau & Wachtel (2017)	17	1870–1929	Yes		Yes	Yes	Authors' data	Deepening episodes significantly enhanced the standard finance–growth dynamic, while deepening associated with financial crises sharply hindered it.	

Notes: World Bank national accounts data, OECD National Accounts data files, Global Financial Development Database (GFDD), Industrial Statistics Yearbook database by United Nations (ISYD-UN), Global Development Indicators (GDI). KLEMS is a worldwide initiative based on a growth accounting framework. Beck *et al.* (2001) use three methodologies: (a) cross-country, (b) cross-industry, and (c) cross-firm.

and the interconnectedness^g nature of the financial system, and from the possibility of contagion^h.

We “wade into” this work on the finance–growth relationship by more comprehensively revisiting the assessment of the impact of five financial development indicators on economic growth over 20 consequent 15-year periods (1980–1995, 1981–1996, ..., 1999–2014). We estimate growth regressions using an IV approach. We find that (1) overall financial development had a positive effect on economic growth for almost all our periods, (2) the legal system is the primary determinant of the effectiveness of the overall financial system, and (3) financial services were relevant for economic growth even during the financial crisis of 2008. This is an initial exploration of the relationship between financial development and economic growth in recent decades. We are leaving issues of the financial structure and the financial crisis effect on economic growth for future research.

The rest of the paper proceeds as follows: Section 2 reviews the literature. Section 3 introduces the estimated models and data. Section 4 presents the estimates. Section 5 concludes.

2. Literature Review

Our research to understand the role of financial system in economic growth is based on the functional approach as in Levine (1997) and Levine (2005). He describes the five functions of financial systems needed to reach financial development: “1) produce information ex ante about possible investments and allocate capital, 2) monitor investments and exert corporate governance after providing finance, 3) facilitate the trading, diversification, and management of risk, 4) mobilize and pool saving and 5) ease the exchange of goods and services” (Levine 2005, p. 869). Hence, when financial development occurs, financial instruments, markets, and intermediaries ameliorate the effects of information, enforcement, and transactions costs in providing the five financial functions and each one function promotes savings and investment decisions and hence economic growth.

Levine (1997) warns about the differences between the functional and the alternative money approach based on the seminal contributions of Gurley & Shaw (1955), Tobin (1965) and McKinnon (1973). In his opinion, they focus on mathematical models that can restrict the analysis of the finance–growth nexus and lead to a misleading distinction between the financial and real sectors. In contrast, the functional approach highlights the value added by the financial sector to economic growth. “The financial system is a ‘real’ sector: it researches firms and managers,

^g “Interconnectedness of financial institutions can have a positive impact on financial development because it promotes greater completeness of financial markets and better distribution of financial risks in normal times. But the interconnected balance sheets of financial firms, through their participation in joint financial infrastructure can spread a shock throughout the national and even international financial system and sometimes amplify those shocks” (*op cit.*, p. 205).

^h “Contagion can cause runs on bank deposits, freezes of money and asset markets, or both” (*op cit.*, p. 206).

exerts corporate control and facilitate risk management, ex-change, and resource mobilization” Levine (1997, p. 689).

In the functional approach, financial markets and institutions may arise to ameliorate the problems created by information and transactions frictions. But the main and primary function of financial systems is “facilitate the allocation of resources, across space and time, in an uncertain environment” (Merton & Bodie 1995, p. 12). And, to be more specific, Levine (1997) describes the channels through which each financial functions may affect economic growth: capital accumulation and technological innovation.ⁱ

There is another branch of this literature that explains the impact of financial structure on economic growth: the *bank-based* and the *market-based* ones. The first highlights that bank-based systems are better at mobilizing savings, identifying good investments, and exerting sound corporate control, particularly during the early stages of economic development and in weak institutional environments. On the other hand, the market-based view emphasizes the advantages of markets in allocating capital, providing risk-management tools, and mitigating the problems associated with excessively powerful banks (Levine 2005).

The literature of financial services is strongly linked with the financial structure evidence because there is still a debate if all services of financial institutions, or only banks or stock market services, have a positive effect on economic growth. Beck *et al.* (2001) use different datasets and econometric methodologies to assess the relationship between financial structure and economic development and they reviewed the *bank-based* view, the *market-based* view, the *law and finance*, and the *financial services views*. In the last two cases, it is not necessary the distinction between bank-based or market-based financial structure and those approaches deny that financial structure exerts influence on growth.

First, they estimate standard cross-country growth regressions to answer the question: “Do countries with bank-based financial systems grow faster than countries with market-based systems, or is financial structure unrelated to the pace of economic development?” They explore the impact of financial structure on long-run economic growth in a sample of 48 countries, with data averaged over the period of 1980–1995. They run an Ordinary Least Square (OLS) and IV regressions.

Second, they explore the impact of financial development and financial structure on industry growth and new firm creation based on an extension of the Rajan & Zingales (1998) model. They use a country-industry panel of 34 countries and 36

ⁱ “On capital accumulation, one class of growth models uses either capital externalities or capital goods produced using constant returns of scale but without the use of nonreproducible factors to generate steady-state per capita growth (Romer 1986, Lucas 1988, Rebelo 1991). In these models, the functions performed by the financial system affect steady-state growth by influencing the rate of capital formation. The financial system affects capital accumulation either by altering the savings rate or by reallocating savings among different capital producing technologies. On technological innovation, the second class of growth models focuses on the inventions of new production processes and goods (Romer 1990, Grossman & Helpman 1991, Aghion & Howitt 1992). In these models, the functions performed by the financial system affect steady-state growth by altering the rate of technological innovation” (Levine 1997, p. 691).

industries to test whether industries that depend more heavily on external finance grow faster in market- or bank-based financial systems, or whether it is the overall level of financial development that is critical in accounting for cross-country differences in industrial growth patterns. They again run OLS and IV models.

Third, they use firm-level data from a panel of 33 countries and 6 years between 1990 and 1995 to explore whether firms' access to external finance varies across financial systems with different structures, or whether the overall level of initial development and legal system determine firms' access to external finance. They run an IV regression on this account.

After comparing the three methodologies, Beck *et al.* (2001) conclude that financial structure (the difference between bank-based and market-based systems) is not an analytically useful way to distinguish the relationship between finance and economic growth, and they argue that the *law and finance* and the *financial services* views are more useful to understand the impact of finance on economic growth.

The *law and finance* view is based on the La Porta *et al.* (1998) work which shows that national *legal origin* strongly influences the legal and regulatory environment governing financial sector transactions. They explain that in general, commercial laws come from two broad traditions: common law, which is English in origin, and civil law, which derives from Roman law. Within the civil tradition, there are three major families that modern commercial laws originate from French, German, and Scandinavian. They also argue that the quality of law enforcement is the highest in Scandinavian and German civil law countries, the next highest in common law countries and the lowest in French civil law countries. Finally, they suggest that the French and the German civil traditions as well as the common law tradition (British) have spread around the world through a combination of conquest, imperialism, outright borrowing, and more subtle imitation. Since legal origin explains cross-country differences in financial intermediary development and since legal origin is (reasonably) exogenous, Levine *et al.* (2000) use this set as IV to control for the simultaneity bias.

Also based on the La Porta *et al.* (1998) data, the empirical literature often includes three indicators of the rights of outside investors and the degree to which these rights are enforced. *Creditor* is an index of the degree to which the legal codes of the country protect the claims of secured creditors in the case of reorganization or liquidation of a company,^j and it ranges from 0 to 4. The authors explain that for

^j *Creditor* is the sum of four dummy variables that indicate whether (1) the reorganization procedure does not impose an automatic stay on assets, thereby not preventing secured creditors from taking possession of loan collateral, (2) secured creditors are ranked first in the case of liquidation, (3) management does not stay in charge of the firm during reorganization, thereby enhancing creditors' power, and (4) management needs creditors' consent when filing for reorganization. *Anti-director* is the sum of six dummy variables that indicate whether (1) shareholders are allowed to mail their proxy vote to the firm, (2) shareholders are not required to deposit their shares prior to the General Shareholders' Meeting, (3) cumulative voting or proportional representation of minorities on the board of directors is allowed, (4) an oppressed minority mechanism is in place, (5) the minimum percentage of share capital that entitles a shareholder to call for an Extraordinary Shareholders' Meeting is less than or equal to 10%, and (6) shareholders have preemptive rights that can only be waived by a shareholders' vote. *Rule of law* use the measure constructed by International Country Risk Guide (ICRG) and is an average over the period (1982–1995) (Beck *et al.* 2001, p. 203).

higher values of *creditor*, outside investors have more rights relative to the management and other stakeholders and should therefore be more willing to provide the external resources that firms need. *Anti-director* is an index of the degree to which the legal codes of the country protect minority shareholder rights, and it ranges from 0 to 6. In economies with higher values of *anti-director*, minority shareholders are better protected against expropriation by management and large shareholders and should therefore be more willing to provide external financing to firms. Finally, *rule of law* is an assessment of the law and order tradition of a country that ranges from 10, strong law and order tradition, to 1, weak law and order tradition. In countries with a higher law and order tradition, outside investors can more easily enforce their claims and rights and should therefore be more willing to provide external finance.

In the last decade, the evidence of the finance–growth nexus is more sophisticated. The use of panel data models with large number of instruments and advanced econometric models has enriched the empirical literature, but Wachtel's (2011) points out that the finance–growth nexus is driven by the within-country relationships more than the between-countries effect; otherwise, the large impact of finance in growth could indicate that the econometric results do not adequately account for reverse causality (*op. cit.*, p. 479).

On the other hand, several studies show the negative impact of finance on economic growth. Beck *et al.* (2016) indicate that higher financial innovation is linked with higher growth volatility among industries which depends on external financing and higher bank losses during the recent crisis. Beck *et al.* (2014) also stress that over shorter time horizons, a large financial sector influences growth but increase volatility in high-income countries, but intermediation activities stabilize the economy in the medium run. And they suggest being careful with the non-linearities in the relationship between finance and growth. They explain that traditional activity of intermediation has declined because financial institutions have diversified into non-lending activities. They mention that financial institutions have focused on proprietary trading, market making, provision of advisory services, insurance and other non-interest income-generating activities, and they do not help to perform the five financial intermediation functions that generate economic growth (*op. cit.*, p. 51).

Other concerns arise from the Global Financial Crisis. The crisis literature is at least as rich and diverse as the finance and growth literature, but in this document, we only focus on the “too much finance” idea and the vanishing growth effect of financial depth, or what Panizza (2014) calls the “new” literature of finance and economic development.^k Rousseau & Wachtel (2011) use a rolling regressions technique to investigate the relationship between the level of financial development and the impact of finance with IV panel regressions for 20 countries. They find that

^kPanizza (2014) also distinguishes between the traditional empirical literature (which started in the late 1960s during Goldsmith (1969)); the new-new of finance and economic growth (who explores alternative measures of financial development, i.e. non-intermediation financial activities, financial innovation and allocation of talents); and the “unknown unknown” category (that study the relationship between state-ownership of banks and economic development).

financial deepening has a strong impact on growth, but also that the benefits of financial deepening disappear in crisis episodes. They also warn that the finance–growth relationship is not as strong in recent data as it was in the original studies from 1960 to 1989. Rousseau & Wachtel (2017) also examine historical data for 17 economies from 1870 to 1929 and conclude that deepening episodes, which they define as increases of more than thirty percent in the ratio of M2 to GDP over a period of 10 years, significantly enhanced the standard finance–growth dynamic, while deepening associated with financial crises sharply hindered it. Therefore, Wachtel (2018) argues that some credit booms are good, because these promote economic growth, while others are bad because they end in financial crises.

Arcand *et al.* (2015) use different empirical approaches to show that there is a positive and robust correlation between financial depth (credit to the private sector) and economic growth in countries with small and intermediate financial sectors, but also that there is a threshold (of around 80–120% of GDP) above which finance starts having a negative effect on economic growth. They consider two explanations to the “vanishing effect”: first, that something has changed in the fundamental relationship between financial depth and growth and, second, that the true relationship between financial development and growth is non-monotonic. And they describe that non-monotonicities might be driven by the increasing role of derivative financial products and the rise of a shadow banking system.¹ According to Claessens *et al.* (2012), the Global Financial Crisis has highlighted the systemic risks that shadow banking can pose, because the securitization function to create private “safe” assets broke down before the crisis and that had significant real and financial spillovers. The World Bank (2013) also expresses its concerns about shadow banking in developing countries, where it is necessary to ensure that shadow banks help provide alternative but safe financial services, without generating unacceptable systemic risks.

Meanwhile, Beck (2018) considers another interpretation of the vanishing growth effect of financial depth. He points that the insignificant or even negative relationship between finance and growth also could be driven by two reasons: the difference in the effect of household credit vs. firm credit^m and the differences between the financial system size vs. services offered by them.ⁿ Our paper represents a step to further enrich the empirical literature of whether financial development promotes economic

¹Ghosh *et al.* (2012) detail that shadow banking comprises a set of activities, markets, contracts, and institutions that operate partially (or fully) outside the traditional commercial banking sector, and, as such, are either lightly regulated or not regulated at all. They also explain that in advanced financial systems, the players typically include money market, credit hedge, investment, and exchange-trading funds; conduits or special purpose vehicles; and finance, insurance, and leasing companies, whereas, in emerging markets, the main participants in the shadow banking systems are finance, leasing, and factoring companies; investment and equity funds; insurance companies; pawn shops; and underground entities.

^mBeck *et al.* (2012) find a positive and significant relationship between enterprise credit and GDP per capita growth, but also that household credit enters insignificantly across different specifications.

ⁿBeck *et al.* (2014) find that intermediation activities increase growth but reduce volatility in the long run, while an expansion of the financial sector along other dimensions has no long-run effect on real sector outcomes. But, over shorter time horizons, a large financial sector stimulates growth at the cost of higher volatility in high-income countries.

Table 2. Data definitions and sources.

Name	Variable definition	Source
Growth	Annual percentage growth rate of GDP per capita based on constant 2010 US dollars. GDP per capita is gross domestic product divided by midyear population.	World Bank and OECD
Development Activity	Log (total value of equity stock traded as share of GDP \times claims on private sector by financial institutions as share of GDP).	GFDD World Bank
Development Size	Log (equity market capitalization + claims on private sector by financial institutions as share of GDP).	GFDD World Bank
Development Efficiency	Log (total value of equity stock traded as share of GDP divided by bank's overhead costs as share of total assets).	GFDD World Bank
Development Aggregate	First principal component of Development Activity, Development Size, and Development Efficiency.	GFDD World Bank
Development Dummy	Takes value 0 if (claims on private sector by banks as share of GDP + value traded as share of GDP) are less than sample mean, 1 otherwise.	GFDD World Bank
Initial GDP	GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. Data are in constant 2010 US dollars.	World Bank and OECD
Schooling	Average years of total schooling.	Barro and Lee (2011)
Inflation	Shows the rate of price change in the economy as a whole (%).	World Bank and OECD

Table 2. (*Continued*)

Name	Variable definition	Source
Black market premium	Formula: $(\text{parallel Xrate}/\text{official Xrate} - 1) \times 100$; values for industrial countries are added as 0.	Levine & Renelt (1985, 1990–93); Adrian Wood (1988); and Global Development Finance & World Development Indicators (1996–1997).
Government Trade	General government final consumption expenditure (% of GDP). Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product. (% GDP).	World Bank and OECD World Bank and OECD
Creditor Anti-director Rule of law	An index aggregating different creditor rights, takes values from 1 to 4. An index aggregating the shareholder rights, takes values from 1 to 6. Measure of the law and order tradition of a country. It ranges from 10, strong law and order tradition, to 1, weak law and order tradition. Is an average over different periods.	Beck <i>et al.</i> (2001) Beck <i>et al.</i> (2001) ICRG
British origin	Takes the value 1 for countries with British legal origin, 0 otherwise.	Beck <i>et al.</i> (2001)
French origin	Takes the value 1 for countries with French legal origin, 0 otherwise.	Beck <i>et al.</i> (2001)
German origin	Takes the value 1 for countries with German legal origin, 0 otherwise.	Beck <i>et al.</i> (2001)
Scandinavian origin	Takes the value 1 for countries with Scandinavian legal origin, 0 otherwise.	Beck <i>et al.</i> (2001)

Notes: World Bank national accounts data and OECD National Accounts data files. Global Financial Development Database (GFDD). International Country Risk Guide (ICRG).

growth. We continue the work of Beck *et al.* (2001) and we test the impact of overall financial services and the legal environment on economic growth using cross-country regressions. We take a longer period, from 1980 to 2014, and we consider 20 windows of 15 years (starting in 1980–1995 and ending in 199–2014) to capture the cross-country differences and their changes over time with a rolling window technique.

3. Estimated Models and Data

3.1. Estimated models

We assess the impact of financial development on economic growth in a sample of 48 countries with data averaged over the period of 1980–2014. We estimate the following growth regression to test the validity of the *financial services* and the *legal and finance views*:

$$\text{Growth}_i = \alpha' X_i + \beta \text{FD}_i + \varepsilon_i, \tag{3.1}$$

where Growth is the average annual growth rate of real per capita GDP, X is a set of potential growth determinants, FD is a set of financial development indicators, and ε is the error term. We leave the description of each financial development indicator to the next section.

Table 3. Average of financial development indicators (1980–2014).

	Country	Development activity	Development size	Development efficiency	Development aggregate	Development dummy
1	Argentina	4.15	3.23	−0.55	−2.29	0
2	Australia	8.11	5.01	3.25	1.26	1
3	Austria	6.50	4.64	1.50	0.04	1
4	Belgium	6.51	4.57	2.16	0.17	0
5	Brazil	6.24	4.25	0.77	−0.55	0
6	Canada	8.48	5.35	3.03	1.56	1
7	Chile	6.35	5.04	1.12	0.21	0
8	China	8.48	4.86	3.81	1.40	1
9	Colombia	4.43	4.03	−0.96	−1.70	0
10	Cyprus	7.35	5.13	1.08	0.53	1
11	Denmark	7.67	4.87	2.48	0.81	1
12	Ecuador	1.81	3.35	−3.29	−3.60	0
13	Egypt	5.97	4.15	1.96	−0.36	0
14	Finland	8.16	4.89	3.91	1.37	1
15	France	7.91	4.86	2.88	0.98	1
16	Germany	8.13	4.84	3.05	1.07	1
17	Ghana	1.13	2.87	−6.28	−5.02	0
18	Greece	6.71	4.51	1.65	0.04	0
19	Honduras	0.00	5.85	0.00	−1.17	1
20	India	6.74	4.32	2.46	0.12	1
21	Ireland	6.85	4.88	3.14	0.79	1
22	Israel	7.06	4.70	1.93	0.35	0
23	Italy	7.45	4.54	2.44	0.48	1
24	Jamaica	3.94	4.26	−1.25	−1.73	0

Table 3. (Continued)

	Country	Development activity	Development size	Development efficiency	Development aggregate	Development dummy
25	Japan	9.15	5.49	4.01	2.13	1
26	Kenya	3.39	3.78	-1.52	-2.34	0
27	Malaysia	7.95	5.42	3.14	1.51	1
28	Mexico	4.78	3.66	0.39	-1.51	0
29	Netherlands	8.50	5.08	4.05	1.65	1
30	New Zealand	6.43	4.76	1.58	0.14	1
31	Norway	7.40	4.66	2.58	0.60	1
32	Pakistan	6.44	3.73	2.23	0.49	1
33	Panama	3.75	4.47	-1.19	-1.60	0
34	Peru	4.02	3.82	-0.67	-1.89	0
35	Philippines	5.76	4.41	0.99	-0.49	0
36	Portugal	7.39	4.80	2.38	0.65	1
37	South Africa	8.00	5.55	2.10	1.33	1
38	Spain	8.61	5.15	3.30	1.52	1
39	Sri Lanka	4.01	3.66	-0.49	-1.97	0
40	Sweden	8.60	5.11	3.42	1.52	1
41	Switzerland	9.81	5.64	4.52	2.58	1
42	Thailand	8.01	5.03	2.75	1.10	1
43	Trinidad and Tobago	4.16	4.45	-0.85	-1.41	0
44	Tunisia	4.52	4.28	-0.45	-1.34	0
45	Turkey	6.39	3.75	1.78	-0.61	1
46	United Kingdom	8.76	5.34	3.39	1.73	1
47	United States	9.75	5.44	3.61	2.14	1
48	Zimbabwe	6.21	5.31	0.71	0.27	0

Notes: We use the countries considered by Beck *et al.* (2001).

Table 4. Average of financial development indicators (1980–1995).

	Country	Development activity	Development size	Development efficiency	Development aggregate	Development dummy
1	Argentina	4.42	3.02	-0.76	-0.98	0.00
2	Australia	6.29	4.46	1.58	0.97	1
3	Austria	5.94	4.48	0.65	0.63	1
4	Belgium	4.80	4.16	0.09	-0.04	0
5	Brazil	4.35	3.57	-1.47	-0.90	0
6	Canada	7.01	5.10	1.71	1.56	1
7	Chile	5.26	4.77	0.23	0.46	0
8	China	6.31	4.35	1.98	1.03	1
9	Colombia	2.98	3.59	-2.43	-1.56	0
10	Cyprus	4.41	4.56	-1.42	-0.35	1
11	Denmark	5.23	4.01	0.41	0.10	0
12	Ecuador	1.82	3.24	-3.14	-2.29	0
13	Egypt	2.50	3.41	1.25	-1.49	0
14	Finland	5.62	4.47	0.94	0.60	1
15	France	6.24	4.59	0.38	0.70	1

Table 4. (Continued)

	Country	Development activity	Development size	Development efficiency	Development aggregate	Development dummy
16	Germany	7.23	4.65	1.74	1.39	1
17	Ghana	0.34	2.68	-7.84	-4.29	0
18	Greece	4.20	3.82	-0.74	-0.62	0
19	Honduras	0.00	3.60	0.00	-1.81	1
20	India	5.03	3.78	0.82	0.03	0
21	Ireland	6.76	0.00	3.27	-0.77	1
22	Israel	6.38	4.33	1.13	0.81	1
23	Italy	5.18	4.19	-0.04	0.05	1
24	Jamaica	4.27	3.93	-0.93	-0.59	0
25	Japan	8.61	5.40	3.27	2.62	1
26	Kenya	1.97	3.53	-2.35	-1.88	0
27	Malaysia	7.06	5.23	2.20	1.77	1
28	Mexico	4.38	3.34	-0.06	-0.63	0
29	Netherlands	6.73	4.68	2.46	1.46	1
30	New Zealand	5.74	4.44	0.90	0.61	0
31	Norway	6.03	4.44	0.95	0.71	1
32	Pakistan	2.52	3.63	-1.71	-1.49	0
33	Panama	0.33	4.02	-4.03	-2.57	0
34	Peru	3.21	2.93	-1.46	-1.58	0
35	Philippines	5.40	4.26	0.39	0.27	0
36	Portugal	5.09	4.21	0.14	0.09	1
37	South Africa	5.93	5.19	0.39	0.92	1
38	Spain	5.99	4.72	0.46	0.71	1
39	Sri Lanka	3.42	3.44	-0.92	-1.10	0
40	Sweden	6.91	4.84	1.25	1.27	1
41	Switzerland	9.59	5.26	7.74	4.04	1
42	Thailand	7.16	4.79	2.26	1.59	1
43	Trinidad and Tobago	3.72	3.94	-1.47	-0.90	0
44	Tunisia	3.73	4.13	-0.91	-0.65	1
45	Turkey	4.49	3.18	-0.02	-0.68	0
46	United Kingdom	7.36	4.91	2.27	1.72	1
47	United States	8.18	5.07	2.23	2.04	1
48	Zimbabwe	3.30	3.73	-0.93	-0.99	0

Notes: We use the countries considered by Beck et al. (2001).

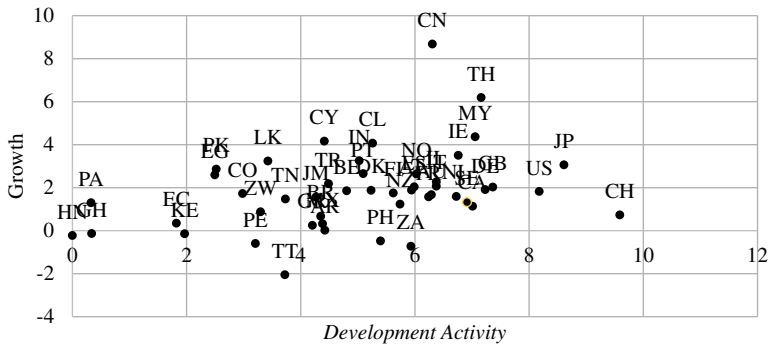
We use the IV approach with TSLS to estimate equation (1) for 20 periods of 15 years each one. We take the cross-country model of Beck et al. (2001) as our point of departure, with the same number of countries (48) and starting with the same period of 1980–1995. Then we move the period of 15 years, one year at a time, until our last we reach our end of sample period; so, we have the periods 1981–1996, 1982–1997, 1983–1998,..., and 1999–2014.

We consider *legal origin (dummies)*, *creditor*, *anti-director*, and *rule of law* as IV for financial development to extract the component of finance that is defined by the legal system. We also examine the appropriateness of the instruments with Woolridge (1995)’s robust score test of overidentifying restrictions. The null hypothesis is that our instruments are valid. We can interpret this result as indicating that our

instruments affect real per capita GDP growth only through the financial development indicators (Beck *et al.* 2001, p. 206)

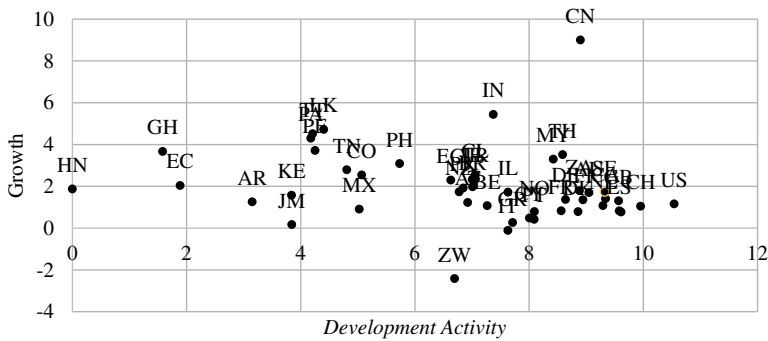
3.2. Data

We assess the impact of financial development on economic growth in a sample of 48 countries took from different sources. All data definitions and sources are given in Table 2. Our dependent variable is the average annual growth rate of real per capita



Notes: This figure shows the average values for 48 sample countries over the indicated time period. Development Activity (DA) is defined as the log of the product of total value of equity stock traded as share of GDP and private credits by financial institutions as share of GDP. Growth is the annual percentage growth rate of GDP per capita based on constant 2010 US dollars.

Fig. 1. Financial development and economic growth (1980–1995).



Notes: This figure shows the average values for 48 sample countries over the indicated time period. Development Activity (DA) is defined as the log of the product of total value of equity stock traded as share of GDP and private credits by financial institutions as share of GDP. Growth is the annual percentage growth rate of GDP per capita based on constant 2010 US dollars.

Fig. 2. Financial development and growth (1999–2014).

GDP. Following (Beck *et al.* 2001), we use the following five indicators of financial Development (*FD*):

- (1) *Development Activity* is a measure of overall activity of financial intermediaries and markets and it is defined as the log of the product of Private Credit and Equity Value Traded.
- (2) *Development Size* is a measure of the overall size of the financial sector and is defined as the log of the sum of Private Credit and Equity Market Capitalization.

Table 5. Components of financial development indicators (1980–2014).

	Country	Private credit	Equity stock traded	Equity market capitalization	Overhead costs
1	Argentina	18.93	4.39	10.95	5.70
2	Australia	75.00	44.45	74.81	1.52
3	Austria	86.58	7.69	17.44	1.85
4	Belgium	51.55	12.99	43.31	1.09
5	Brazil	36.61	14.09	33.52	5.21
6	Canada	105.95	45.37	102.18	2.12
7	Chile	64.60	8.76	88.98	2.83
8	China	96.35	50.81	33.46	1.13
9	Colombia	30.29	2.77	27.13	6.94
10	Cyprus	135.23	11.29	33.61	3.53
11	Denmark	91.18	23.43	39.58	1.45
12	Ecuador	21.80	0.28	6.78	7.10
13	Egypt	33.01	11.84	30.20	1.65
14	Finland	67.56	51.98	65.58	0.93
15	France	82.58	32.85	46.28	1.15
16	Germany	94.74	35.93	31.34	1.41
17	Ghana	7.70	0.40	9.89	6.98
18	Greece	54.62	14.95	36.62	2.79
19	Honduras	35.25	0.00	313.50	5.24
20	India	30.04	28.45	45.77	2.29
21	Ireland	78.44	12.00	52.28	0.60
22	Israel	63.67	18.25	45.94	2.36
23	Italy	63.63	27.05	30.54	2.08
24	Jamaica	23.02	2.24	48.03	7.95
25	Japan	166.48	54.13	70.58	0.89
26	Kenya	23.67	1.25	19.94	6.03
27	Malaysia	98.95	28.72	126.76	1.22
28	Mexico	18.68	6.35	20.21	4.48
29	Netherlands	92.43	53.07	64.64	1.02
30	New Zealand	78.44	7.94	38.92	1.47
31	Norway	81.01	23.32	35.22	1.56
32	Pakistan	22.61	27.59	18.97	2.98
33	Panama	63.15	0.65	23.24	2.69
34	Peru	17.34	3.16	28.27	5.15
35	Philippines	32.68	9.73	49.49	3.32
36	Portugal	91.68	17.68	30.18	1.61
37	South Africa	104.21	28.52	152.75	3.45
38	Spain	99.70	55.03	72.50	1.60

Table 5. (Continued)

	Country	Private credit	Equity stock traded	Equity market capitalization	Overhead costs
39	Sri Lanka	22.05	2.46	16.59	3.74
40	Sweden	98.45	55.24	66.84	1.49
41	Switzerland	141.09	129.00	141.44	1.97
42	Thailand	96.44	31.28	55.82	2.04
43	Trinidad and Tobago	37.92	1.69	47.60	3.96
44	Tunisia	59.96	1.53	12.09	2.56
45	Turkey	21.87	27.11	20.79	4.30
46	United Kingdom	110.35	57.19	95.56	1.77
47	United States	140.39	122.55	91.01	3.18
48	Zimbabwe	19.09	26.08	153.59	12.77

Notes: *Private Credit* is the value of credits by deposit money banks and other financial institutions to the private sector divided by GDP. *Equity Stock Traded* is the value of total shares traded on the stock market exchange (both domestic and foreign) divided by GDP. *Equity Market Capitalization* is the value of listed domestic shares divided by GDP. *Overhead Costs* is the accounting value of a bank's overhead costs as a share of its total assets.

- (3) *Development Efficiency* measures the efficiency of financial intermediaries and markets and is defined as the log of the ratio of Equity Value Traded and Overhead Costs.
- (4) *Development Aggregate* combines the previous three measures and is thus a conglomerate indicator of the activity, size, and efficiency of the financial sector and it is the first principal component of the first three indicators.
- (5) *Development Dummy* equals 0 if both Private Credit and Equity Value Traded are less than the sample mean and 1 otherwise.^o

Table 3 shows the average of financial development indicators from 1980 to 2014. We observe that Switzerland is the country with the highest level of financial activity with 9.81 followed by United States with 9.75 and Japan with 9.15 points. The lowest levels of financial activity are in Honduras, Ghana, and Ecuador with 0, 1.13, and 1.81 points each. We also obtain the financial development indicators over the period of 1980–1995 (Table 4) and they are consistent with Beck et al. (2001).

We include Figs. 1 and 2 to observe the variation of the finance–growth nexus between the first and the last period of our sample. The figures show the correlation between financial activity and economic activity in two periods: 1980–1995 and 1999–2014. In both cases, we use Development Activity (DA) as our financial development indicator. In the first period (1980–1995), we observe that Ghana and Honduras and Panama had the lowest levels of financial development and economic growth, while in the last period (1999–2014) Ghana and Honduras were still in the last position, but Panama was replaced by Ecuador. On the other hand, Switzerland,

^o *Private Credit* is the value of credits by financial intermediaries to the private sector divided by GDP. *Equity Value Traded* measures the activity of the stock market trading volume as a share of national output. *Equity Market Capitalization* is defined as the value of listed shares divided by GDP. And high *Overhead Costs* may reflect inefficiencies in the banking system (Beck et al. 2001, p. 196).

Table 6. Economic growth and potential growth determinants (1980–2014).

	Country	Growth	Initial GDP pc*	Schooling	Black market premium	Inflation	Government	Trade	Creditor	Anti- director	Rule of law	Legal origin
1	Argentina	0.98	8053	8.24	29.02	233.07	11.60	24.62	1	4	3.7	F
2	Australia	1.79	29,787	11.27	0	4.41	17.83	37.04	1	4	5.9	B
3	Austria	1.65	27,514	8.93	0	2.43	18.88	80.19	3	2	6.0	G
4	Belgium	1.53	27,478	9.59	0	2.43	22.15	130.38	2	0	5.5	F
5	Brazil	1.24	8268	5.08	41.71	335.24	16.51	21.11	1	3	2.8	F
6	Canada	1.35	31,769	10.91	0.0	3.21	21.20	62.09	1	5	6.0	B
7	Chile	3.39	4934	5.64	15.34	11.30	11.67	60.56	2	5	4.6	F
8	China	8.76	348	6.05	53.33	11.30	13.94	37.12	2	3	4.3	G
9	Colombia	1.99	3753	6.03	10.28	16.54	14.23	33.62	0	3	1.4	F
10	Cyprus	2.26	13,165	8.87	4.07	4.44	16.07	114.64			4.5	B
11	Denmark	1.42	36,378	9.66	0	3.20	25.10	79.03	3	2	6.0	S
12	Ecuador	1.18	3687	6.52	32.19	3.20	12.73	47.56	4	2	3.5	F
13	Egypt	2.49	1213	4.21	11.54	10.69	12.79	52.39	4	2	3.4	F
14	Finland	1.83	25,662	8.59	0	3.53	21.33	65.15	1	3	6.0	S
15	France	1.27	26,964	8.38	0	3.11	22.52	48.62	0	3	5.2	F
16	Germany	1.62	26,066	9.83	0	3.11	19.29	57.61	3	1	5.5	G
17	Ghana	1.79	901	5.28	437.34	31.12	11.64	62.79			2.4	B
18	Greece	0.51	19,144	8.36	7.68	9.61	18.67	47.16	1	2	4.1	F
19	Honduras	0.88	1644	4.51	29.63	10.48	13.66	94.31			2.1	F
20	India	4.31	394	3.62	12.09	10.48	11.30	28.11	4	5	3.4	B
21	Ireland	3.38	16,961	10.36	0	4.12	18.00	139.77	1	4	5.5	B
22	Israel	2.02	17,220	11.34	6.98	41.32	28.09	77.83	4	3	4.3	B
23	Italy	1.03	24,452	7.89	0	5.51	18.78	45.31	2	1	5.0	F
24	Jamaica	0.61	3709	7.49	24.24	5.51	14.87	96.50			2.3	B
25	Japan	1.82	25,489	10.17	0.55	0.30	16.28	23.69	2	4	5.4	G
26	Kenya	0.66	898	4.44	17.16	10.69	16.39	56.72	4	3	2.8	B
27	Malaysia	3.57	3309	7.26	1.08	3.48	13.25	160.62	4	4	4.0	B
28	Mexico	0.90	7471	6.30	10.83	3.48	10.77	44.77	0	1	2.7	F
29	Netherlands	1.52	30,078	10.53	0	2.05	22.93	117.06	2	2	6.0	F
30	New Zealand	1.42	22,543	11.50	0	4.77	18.04	57.99	3	4	5.9	B
31	Norway	1.89	48,552	10.69	0	4.70	20.26	71.14	2	4	6.0	S

Table 6. (Continued)

	Country	Growth	Initial GDP pc*	Schooling	Black market premium	Inflation	Government	Trade	Creditor	Anti- director	Rule of law	Legal origin
32	Pakistan	2.21	556	3.02	12.67	4.70	11.23	34.17	4	5	2.7	B
33	Panama	2.89	4387	7.78	0	2.75	14.95	129.55			2.7	F
34	Peru	1.54	3727	7.29	54.86	306.66	10.83	39.48	0	3	2.5	F
35	Philippines	1.29	1687	6.98	7.57	9.07	9.94	73.43	0	3	2.6	F
36	Portugal	1.73	12,388	5.71	5.68	9.07	17.31	63.42	1	3	5.1	F
37	South Africa	0.55	6603	7.03	2.12	10.82	18.74	52.54	3	5	2.4	B
38	Spain	1.58	17,442	7.92	2.79	5.12	17.11	47.21	2	4	4.8	F
39	Sri Lanka	4.01	927	8.39	14.68	10.85	10.48	69.19	3	3	2.4	B
40	Sweden	1.64	31,094	10.94	0	10.85	25.65	72.16	2	3	6.0	S
41	Switzerland	0.95	54,497	10.89	0	1.89	10.79	93.75	1	2	5.7	G
42	Thailand	4.21	1404	4.66	0.02	3.99	12.94	95.37	3	2	4.1	B
43	Trinidad and Tobago	1.76	9407	8.62	35.75	6.15	15.10	86.65			3.6	B
44	Tunisia	2.32	2029	4.20	7.41	6.15	16.70	89.03			4.1	F
45	Turkey	2.42	4788	4.91	6.08	44.29	11.60	41.74	2	2	3.8	F
46	United Kingdom	1.75	21,795	9.70	0	4.25	19.09	51.68	4	5	5.6	B
47	United States	1.62	28,734	12.65	0	2.87	15.46	22.79	1	5	5.7	B
48	Zimbabwe	-0.39	1146	5.31	57.45	2.87	17.55	68.20	4	3	2.7	B

Notes: We take the Policy Conditioning Information set (initial GDP, schooling, inflation, black market premium, government and trade) using by Beck *et al.* (2001). Legal origin: British (B), French (F), German (G), Scandinavian (S). *2010 US dollars.

Table 7. Descriptive statistics for cross-country data.

	Mean	Std. dev.	Min.	Max.	Obs.
Growth	1.94	1.40	-0.39	8.76	48
Development Activity	6.42	2.20	0.00	9.81	48
Development Size	4.62	0.68	2.87	5.85	48
Development Efficiency	1.50	2.12	-6.28	4.52	48
Development Aggregate	0.00	1.58	-5.02	2.58	48
Development Dummy	0.58	0.50	0.00	1.00	48
Initial GDP pc*	14,592.0	13,749.1	347.9	54,497.5	48
Schooling	7.78	2.46	3.02	12.65	48
Black market premium	0.26	0.71	0.00	3.35	48
Inflation	19.84	63.52	0.00	437.34	48
Government	16.38	4.40	9.94	28.09	48
Trade	66.79	32.43	21.11	160.62	48
Creditor	2.12	1.35	0.00	4.00	41
Anti-director	3.10	1.28	0.00	5.00	41
Rule of law	4.22	1.39	1.42	6.00	48
British origin	0.40	0.49	0.00	1.00	48
French origin	0.42	0.50	0.00	1.00	48
German origin	0.10	0.31	0.00	1.00	48
Scandinavian origin	0.08	0.28	0.00	1.00	48

Notes: This table shows the main descriptive statistics for the all variables from 1980 to 2014. *2010 US dollars.

United States, and Japan had the highest levels of finance and growth in Fig. 1, but Spain was ranked third in Fig. 2.

A key component of our *Financial Development (FD)* indicators is *Private Credit*, which measures the credit by deposit money banks and other financial institutions to the private sector divided by GDP. [Levine et al. \(2000\)](#) explain that higher levels of *Private Credit* could be interpreted as higher levels of financial services and therefore greater financial intermediary development. Table 5 shows the average of Private Credit (% of GDP) from 1980 to 2014. Japan, Switzerland, and United States have the highest levels of financial intermediation; meanwhile, Ghana, Peru, and Mexico have the lowest.

Other important elements to obtain our FD indicators are total value of *Equity Stock Traded (EST)* and *Equity Market Capitalization (EMC)*. The first indicates the value of total shares traded on the stock market exchange (both domestic and foreign) divided by GDP and, the second, is defined as the value of listed domestic shares divided by GDP. [Levine & Zervos \(1998\)](#) suggest that trading volume as a share of national output should positively reflect liquidity on an economy-wide basis, while *Equity Market Capitalization* is used as an indicator of market development relative to the economy. In Table 5, we observe that Switzerland, United States, and United Kingdom provide more liquidity to their economies by the stock market channel, whereas the size of the stock market reaches the higher levels in Honduras, South Africa, and Zimbabwe. The above results show that *EST* and *EMC* are measures of the liquidity and the size of the stock market relative to the size of their

Table 8. Financial development and economic growth IV with all instruments.

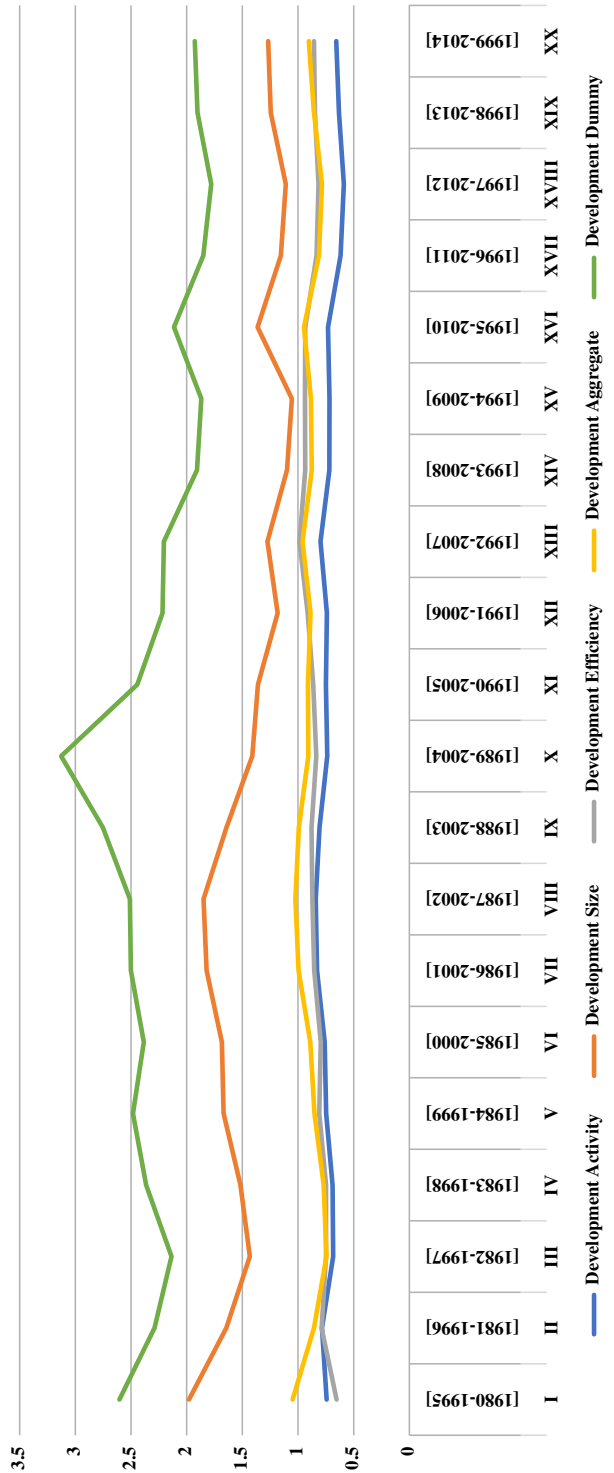
IV Regressions. Dependent variable real GDP growth by period										
Model Period	I [1980–1995]	II [1981–1996]	III [1982–1997]	IV [1983–1998]	V [1984–1999]	VI [1985–2000]	VII [1986–2001]	VIII [1987–2002]	IX [1988–2003]	X [1989–2004]
Development Activity	0.7433***	0.7845***	0.6845**	0.6896**	0.7473***	0.7611***	0.8293***	0.8409***	0.8068**	0.7377**
Development Size	1.9791**	1.6442**	1.4325**	1.5165**	1.6686**	1.6842**	1.8215***	1.8490**	1.6433**	1.4113**
Development Efficiency	0.6537**	0.7885***	0.7483**	0.7485**	0.8092***	0.7958***	0.8546***	0.8708***	0.8785***	0.8355***
Development Aggregate	1.0486**	0.8570***	0.7443**	0.7690**	0.8520***	0.8896***	0.9950***	1.0232***	0.9933**	0.9076**
Development Dummy	2.6041***	2.2888**	2.1362**	2.3640**	2.4821***	2.3853**	2.5012***	2.5099***	2.7524**	3.1271
Model Period	XI [1990–2005]	XII [1991–2006]	XIII [1992–2007]	XIV [1993–2008]	XV [1994–2009]	XVI [1995–2010]	XVII [1996–2011]	XVIII [1997–2012]	XIX [1998–2013]	XX [1999–2014]
Development Activity	0.7500**	0.7411**	0.7983**	0.7184**	0.7169*	0.7310**	0.6176**	0.5884*	0.6321*	0.6561**
Development Size	1.3602*	1.1826*	1.2745*	1.0988	1.0551*	1.3634*	1.1540*	1.1102*	1.2448*	1.2683*
Development Efficiency	0.8633**	0.9134**	0.9863***	0.9358***	0.9378*	0.9349**	0.8339**	0.8156**	0.8480**	0.8571**
Development Aggregate	0.9113**	0.8881**	0.9596**	0.8767**	0.8847*	0.9459**	0.8123**	0.7851*	0.8570**	0.9032**
Development Dummy	2.4333**	2.2169**	2.2047*	1.9069*	1.8691*	2.1145**	1.8508*	1.7795*	1.9025*	1.9268*

Notes: All regressions include the policy conditioning information set: logarithm of initial income, schooling, inflation, black market premium, government size, and trade openness. We use legal origin dummies (British, French, and German relative to Scandinavian origin), creditor, anti-director, and rule of law as instruments for financial development. All regressions pass Wooldridge's (1995) robust score test of overidentifying restrictions.

*Statistical significance at 10% level.

**Statistical significance at 5% level.

***Statistical significance at 1% level.



Notes: This figure shows the evolution of the relationship between financial development indicators and real economic growth with IV model (Table 8) with IV coefficients. The dependent variable is real GDP per capita growth.

Fig. 3. Financial development and economic growth with IV.

economies, but these measures should not be interpreted as direct indicators of the liquidity and size of the market (Beck & Levine 2004).

The last component to construct the Financial Indicator is *Overhead Costs*, which is the accounting value of a bank's overhead costs as a share of its total assets. Beck *et al.* (2010) describe that higher levels of *Overhead Costs* indicate lower levels of banking efficiency, as banks increase their costs and there is a higher wedge between lending and deposit interest rates. Ireland, Japan, and Finland have lower ratios of Overhead Costs and their banking activity is more efficient than the rest of the countries (Table 5).

We also detail our set of potential growth determinants for each country (Table 6). We consider the initial GDP per capita to control for convergence, years of total schooling to control for the effect of human capital accumulation, the average rate of inflation as macroeconomic stability, the government size as share of GDP to proxy for government intrusion, the average black market premium, and the exports plus imports as share of GDP to capture the degree of openness of economies. We choose three dummies for *legal origin* (British, French, and German relative to Scandinavian origin) and *creditor*, *anti-director*, and *rule of law* as instruments. Table 7 shows the mean statistics of our cross-country data: mean, standard deviation, minimum, maximum, and the number of observations.

4. Results

Table 8 and 3 present the IV coefficients for equation (1) with the instruments mentioned before.^P We confirm that financial development is positively correlated with long-run economic growth over *almost all* periods of our sample (since 1980–1995 until 1999–2014). Only in two regressions (of one hundred), our coefficients were not statistically significant (numbers without asterisk). We also confirm that instruments affect real per capita GDP growth only through the financial development indicators (coefficients in bold).

We also find that *creditor*, *anti-director*, *rule of law* and three dummies for *legal origin* (British, French, and German relative to Scandinavian origin) were good instruments for the financial structure indicators. Finally, in all regressions, we could not reject the null hypothesis that our instruments are valid.

5. Conclusion

We estimate cross-country growth regressions for 48 countries during 20 periods of 15 years starting in 1980 and ending in 2014. We have three main conclusions. First, the IV coefficients in Table 8 show that overall financial development has a positive

^P Each coefficient represents one regression using real GDP growth as dependent variable and considering the policy conditioning information set: Logarithm of initial income, schooling, inflation, black market premium, government size, and trade openness.

effect on economic growth during (almost) *all* the 20 periods (from 1980–1995 to 1999–2014) and this supports the *financial services* view. Second, we confirm that *law and finance* view is valid in *all* our sample data, because legal system characteristics are good instruments for the financial indicators during all periods. Last, but not the least, our results suggest that financial development matters for economic growth even considering the effect of the global financial crisis.

This research is the initial work of new evidence of the finance–growth nexus based on rolling windows regressions during the recent decades. We are leaving for future research a deeper analysis of the financial structure (*bank-based* or *market-based*) and the financial crisis effect on economic growth. Future research will hopefully provide more evidence to help explain the mechanism through which financial development has influenced economic growth during recent years.

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